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(84) Methods and apparatus for efficient allocation of resources by optimizing nonlinear, convex functions with linear constraints.

(57) A method and apparatus is described for optimally allocating resources. The optimal allocation is done by minimizing a cost (which is a convex non-linear function of various allocation variables) subject to different constraints (which are linear functions of the allocation variables). The method initially picks a state of the above variables (x_0) in the interior of the solution polytope (where the constraints are satisfied) and computes successive states x_1, x_2, \dots , which progressively reduces the cost of allocation. The above iteration stops when suitable stopping rules are met.

The method employs (i) an affine scaling transformation (a variant of Karmarkar's projective transformation) of the linear constraints, (ii) an ellipsoid to sphere transformation of the curved cost surfaces, (iii) a potential search scheme on the curved constant cost surfaces, (iv) an affine scale adjustment mechanism, and (v) a line-search scheme.

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